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Chemistry Teachers Training in Spain



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CHEMISTRY TEACHERS TRAINING IN SPAIN

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ABSTRACT

The attention to the needs in the training of teachers gave rise to the introduction of a new Master of initial teacher training of one-year duration in Spain, which is also offering a permanent training of teachers by high educational institutions. After a detailed description of the current situation for both, initial and permanent training, based on the contributions of some authors and the conclusions of several meetings with teachers and experts, held in Granada in the framework of the project "Chemistry is all around Network" during the 2012, concluded with the analysis of the strengths of the Master of initial teachers training and the current structure of the permanent formation in Spain. However, have been detected weak points in due to several factors mostly related to a hasty commissioning. At the same time, we analyse the impact of the project "Chemistry is all around Network" and the products' results, obtained by the same teachers, experts and educational centres involved in the "Chemistry is all around Network" European project.

1. National Situation on Teacher Training

1.1 Initial Teacher Training

From 70's to 2009, in Spain the teacher training was carried out through the CAP (certificate of pedagogical aptitude), an Educational Certificate with serious deficiencies in its structure and organization, and just an administrative procedure for students who wanted to access to the secondary education teachers' group.

From the academic course 2009/2010 the CAP has been replaced by a Master of a year-long (60 credits-1500 hours), organized by the Spanish public and private universities. To be part of the Master it is necessary to be in possession of an official Spanish university degree, or if any other declared expressly equivalent or one issued by an institution of the European area of higher education (EEES). To access to any speciality applied must possess a university degree in that specialty, have completed 60 credits in matters inherent to the specialty or exceeding a theoretical-practical knowledge test. The allocation of seats is done according to the academic record.

In view of the shortcomings of this kind of training, different meetings and workshops were held to discuss and propose improvements for the initial formation needs of the teachers, looking for a renewal of the teaching training approach. Among the proposals that came out from those meetings, they stressed some ones such as: the need for coherence between the orientation of the courses and the strategies pretended to be applied by future teachers to use with their students, the evaluation of the work done by the students and courses received during their training and the importance of a close collaboration between the practicum teachers and the specific contents of the master.

Finally, the master was carried out in order to achieve the following skills, listed in the order ECI/3858/2007:

1.1.1. General competencies:

G1. Meet the curricular contents of the matters relating to the teaching specialization, as well as the body of the didactic knowledge about the teaching and learning processes. For vocational training will include knowledge of the respective professions.

G2. To plan, develop and evaluate the teaching and learning process promoting educational processes which facilitate the acquisition of specific competencies, working individually and in collaboration with other teachers and professional staff.

G3. To search, obtain, process and communicate information (oral, printed, audio-visual, digital or multimedia), transform it into knowledge and apply it in the processes of teaching and learning in matters inherent to the specialization courses.



G4. To specify the curriculum that will be implemented in a school participating in the same collective planning; develop and implement both group and custom, didactic methodologies adapted to the diversity of the students.

G5. To design and develop learning spaces with special attention to equity, emotional and education in values, equality of rights and opportunities between men and women, citizen training and respect for human rights that facilitate life in society, taking decisions and building a sustainable future.

G6. To acquire strategies to stimulate the efforts of the student and promote their ability to learn by their self and with others, and develop thinking and decision-making skills that facilitate personal autonomy, confidence and initiative.

G7. To understand the processes of interaction and communication in the classroom, master skills, and social skills necessary to foster learning and living together in the classroom, and address problems of discipline and conflict resolution.

G8. To design and formal and non-formal activities that help make the Centre a place of participation and culture in the environment where it is located; develop the functions of mentoring and orientation of students in a collaborative and coordinated manner; participate in the evaluation, research and innovation in teaching and learning processes.

G9. To learn about regulations and institutional organization of the educational system and models of quality improvement with application to educational establishments.

G10. To understand and to analyse the historical characteristics of the teaching profession, the current situation and prospects of interaction with the social reality of each era.

G11. To inform and to advise families about the process of teaching and learning and their characteristics in order to increase the personal, academic and professional knowledge development of the pupils.

In addition to the aforementioned General competences the students of this Master may

G12. Complete knowledge of relevant disciplines in all the aspects which may be of special interest for the teaching and dissemination of the discipline, as well as the increase in the interest and appreciation of them at different educational levels.

1.1.2. Specific competencies:

CE.1. To know the characteristics of the students, their social contexts and motivations.

CE.2. To understand the development of the personality of these students and possible dysfunctions that affect learning.

CE.3. To develop proposals based on the acquisition of knowledge, skills and intellectual and emotional skills.

CE.4. To identify and to plan for the resolution of educational situations affecting students with different abilities and different rates of learning.

CE.5. To understand the processes of interaction and communication in the classroom and in the Centre, address and resolve potential problems.

CE.6. To learn about the historical evolution of the educational system in our country.

CE.7. To know and to apply resources and strategies of information, mentoring and academic and vocational guidance.

CE.8. To promote actions of emotional education, values and citizen training.

CE.9. To participate in the definition of the educational project and the General activities of the centre according to criteria of improvement of the quality, attention to diversity, prevention of learning disabilities and coexistence.

CE.10. To interact with the environment education and understand the educational function of the family and the community, both in the acquisition of skills and learning and education on respect for rights and freedoms, equality of rights and opportunities between men and women and the equality of treatment and non-discrimination of persons with disabilities.

CE.11. To learn about the historical evolution of the family, its different types and incidence of the family context in education.

CE.12. To acquire Social skills in the relationship and family-oriented.

CE.13. To learn about the educational and cultural value of the corresponding specialization matters and the content that is present in the respective teachings.

CE.14. To know the history and recent developments of materials and their prospects for being able to pass a dynamic vision of the same.



- CE.15. To learn about contexts and situations that are used or apply the curricular contents.
- CE.16. In vocational training, to know the evolution of the world of work, the interaction between society, work and quality of life as well as the need for adequate training to adapt to the changes and transformations that might require the professions.
- CE.17. In the case of psycho-pedagogical and vocational guidance, learn about the processes and resources to the prevention of learning disabilities and coexistence, the processes of evaluation and academic and vocational guidance.
- CE.18. To know the theoretical and practical developments of the teaching and learning of relevant materials.
- CE.19. To transform the curricula into activities and work programmes.
- CE.20. To purchase criteria of selection and preparation of educational materials.
- CE.21. To foster a climate that facilitates learning and put in value the contributions of the students.
- CE.22. To integrate training in audio-visual and multimedia communication in the teaching-learning process.
- CE.23. To learn strategies and techniques for assessing and understanding evaluation as an instrument of regulation and stimulus effort.
- CE.24. To know and apply innovative teaching approaches in the field of specialization courses.
- CE.25. Critically analyse the performance of teaching practices and orientation using quality indicators.
- CE.26. Identify the problems related to the teaching and learning of the subjects of specialization and propose alternatives and solutions.
- CE.27. To know and to apply methodologies and techniques of educational evaluation and research and be able to design and develop projects of research, innovation and evaluation.
- CE.28. To obtain and increase experience in the planning, teaching and assessing the corresponding specialization matters.
- CE.29. To demonstrate a proficiency in speaking and writing in teaching practice.
- CE.30. To acquire the skills and social skills necessary to foster a climate that facilitates learning and living together.
- CE.31. To participate in the proposed improvements in the different fields of action from the reflection based on practice.
- CE.32. For vocational training, know the business type corresponding to the productive sectors and understand the most common organizational systems in companies.
- CE.33. Connected to the orientation is important to practice the psychopedagogical evaluation, advice to other education professionals, students and families.

1.1.3. The structure of the Master on Initial Teacher Training:

The master is structured in three modules:

The first one, called generic, (12 credits) is subdivided into the following themes:

Learning and development of personality: Regarding to know the characteristics of the students, their contexts and motivations and understand the development of their personality and possible dysfunctions that affect their learning.

Processes and educational contexts: Referred to the skills that must be acquired related to the development of communication competences in the classroom, at the Centre and troubleshooting processes.

Society, family and education: Education and the environment are related and presents the educating function of family and community for skills based on respect and equality of rights and freedoms.

The second one, called specific (14 credits) is subdivided in turn into three themes:

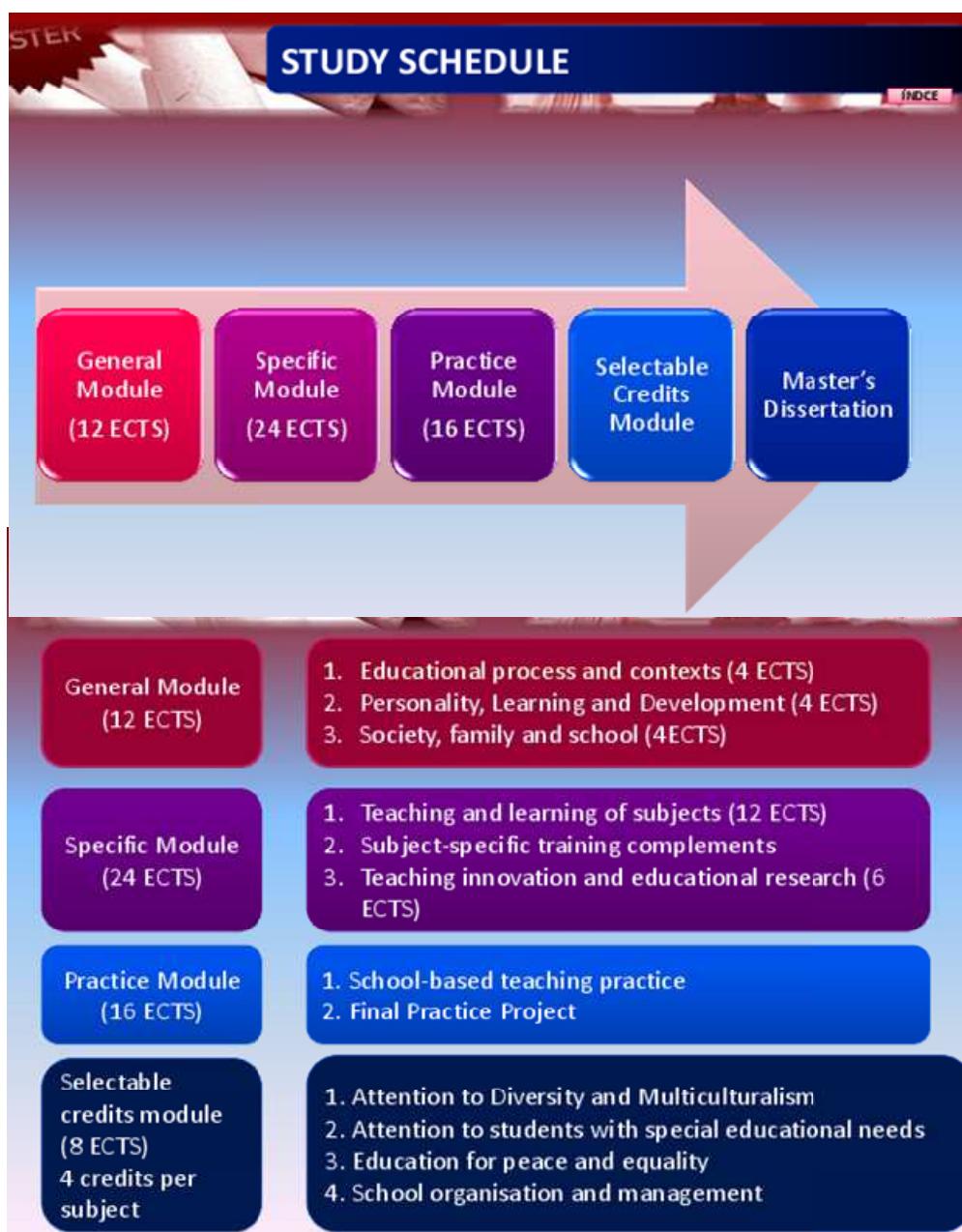
Accessories for training discipline: Concerning to those contents that the future teacher must learn to convey a dynamic vision of the matter of their specialty through history, recent developments and contexts and situations that apply the curricular contents. In this section is that strategies are developed to update the scientific knowledge, and that trying to promote contact between teachers and experts.

Learning and teaching of the corresponding matters: Addressed to acquire knowledge about the theoretical and practical developments of the relevant subject and you learn to transform curricula in activities and work programmes. It is also taught to develop and select educational materials and to



include the strategies and techniques of evaluation and training and in audio-visual and multimedia communication in the teaching-learning process.

Teaching innovation and introduction to educational research: here, aims to the future teacher to learn and to apply innovative proposals of teaching on the subject of his specialty, technical basic of research and educational evaluation and development of projects for research, innovation and evaluation. The methodology used in the first two modules depends on the University that are developed. They generally consist of classes, but some universities offer distance or blended courses. The use of new technologies is conducted in oral presentations in the classroom and they are part of the support in the blended courses or distance.



(Fig.1.). Structure of the **Master on Initial Teacher Training**.

The third module (16 credits) is the practicum, which looks for future teachers to acquire experience in planning, teaching and evaluation materials from your specialty. In this module you must prove a suitable domain of the speaking and writing in teaching practice and master appropriate skills to facilitate the learning and living together.

The first part consists of the completion of 100 hours of teaching practices in the specialty chosen in a school of secondary education. These one hundred hours are spread over a period ranging from four to six weeks under the guidance of a teacher at the Centre that guides the work of the student practices and issued a report on competencies and skills displayed by the student during this period. During the practicum, a supervisor of practices carried out seminars of tracking which students must attend. This part ends with the delivery of a final report that includes a self-evaluation of the student, corrected by the supervisor of practices.

In a second part, the student must be a work of Master thesis which should reflect the competencies acquired throughout the training process and which must be defended publicly.

1.2 In-service Teacher Training

The Education Act set up that the teacher education is a right and an obligation for teachers and is the responsibility of the educational administrations and centres.

The training of teachers practicing in Spain is organized by the Ministry of education through the INTEF (National Institute of educational technology and teacher training), the ministries of education of the communities autonomous through the CEP (teacher training centres), the universities continuing education centres, and by trade unions, employers, associations of teachers or private institutions such as CECE or Catholic schools that offer training through agreements with administrations educational.

After the initial training of teachers is being created in Spain a new model of continuing education in collaboration with the autonomous communities under the following lines: improving school success, acquisition of basic skills, application of ICT in the classroom, multilingualism, inclusion and coexistence, quality in the management of the centres, early childhood education and educational leadership. Also meetings and conferences are promoted to share experiences and innovative actions and aims to the creation of networks of teachers and training for teams of teachers to facilitate the collaborative work. (Sea Jimenez). A brief look at the offer of training comprises the majority of training courses in one of the following sections:

- Generic training courses on organization and management of schools or educational guidance and tutorial action.
- Courses to improve knowledge of the subject that is taught: Although there are few which offer is the majority of these courses they depart from the CEP and the universities and show teachers the latest advances in related fields to your stuff. This type of courses promotes the gathering between teachers and experts.
- Courses on new methodologies and teaching practices: most destined to develop teaching methods, constructivist and more collaborative teaching practices. In years, increases the offer of courses based on Gardner's multiple intelligences theory and models of cooperative learning-Courses of educational system update: due to frequent changes in the education legislation, offer numerous courses aimed to update the teaching staff following the adoption of new laws and changes in methodological approach resulting from its implementation. After the last educational reform emerged offers training on evaluation in competencies.
- Courses of adaptation to new technologies: the majority of these courses are aimed at the creation and implementation of teaching resources based on new information and communication technologies.
- Courses aimed and promoting multilingualism. In the majority of cases are English courses to accredit training in the knowledge of English among teachers that allows to carry out successfully the implementation of an educational model with presence of more than one language.

In general, permanent training of the teaching staff in Spain are voluntary. Most of the courses are face to face, although you can find distance learning courses, especially in the area of ICT learning. Already begin to see courses aimed at developing training in the actual work of Professor environment through joint activities with a first face-to-face part and implementation in schools. However a final evaluation check missing in many of them and in cases such as the implementation of bilingualism in some centres the process is carried out in an unequal way and somewhat hasty.

Most of the training courses are offered during the school year except for summer courses that carry out some universities during the holiday period, and most are carried out by teachers keen to improve teaching practice or seeking to score points with a view to possible transfer competitions.

However, the process of change in the permanent teacher training remains open. Without losing sight of the specific needs of education professionals, at recent seminars and conferences begins to take shape the idea of training in centres linked to their educational projects. In this way, training would be generated depending on the needs of schools. (Palos, Josep),

2. Assessment of the National Training of Science Teachers

2.1. Initial training.

Concerning to the initial teacher training, studies after the first year of implementation 2 of the master's initial training of the show many weak points that stand out:

- Haste and precipitation in the implementation of the master.
- Criteria economic to design the curriculum of some universities.
- The absence of coordination between the institutions and the Faculty involved.
- The erroneous allocation of teaching in some subjects of the master.
- The time allotted for the completion of the master's degree is considered insufficient or not suitable to the degree of demand.
- Lack of consistency between teaching models that are used and which is intended to be the future teachers to use in the classroom.
- Lack of control of results in the evaluation of the teachings.

Among the strengths they are noteworthy:

- The high degree of involvement of teachers and students who participate.
- Can become an instrument of permanent training of tutors at the same time that initial training for future teachers. (Vilches)
- Strengthens relations between the University and secondary school teachers.
- The use of virtual environments.

The opinion of the participants in the seminar on training of teachers held in Granada is quite critical of the process of initial training of teachers and found several deficiencies in the generic module since it does not seem to be coordinated with the specific module and just is connection between the two. Although everyone considers necessary the change that took place in 2009, most considered that insufficient change.

2.2. Formación permanente

In the section on permanent training, strengths seem to be:

- The wide range of courses available to teachers through numerous institutions.
- The motivation shown by teachers who perform permanent training courses.
- Free of many of the courses offered by the administration.

And weak points include:

- Not mandatory training courses.
- The majority of the courses do not have a practical part of application in the classroom.
- The lack of final evaluation in many of these courses.

The Faculty Assistant for the teacher training seminar highlights the importance of training courses related to the use of ICT in education, especially those who try to use of social networks, but are critical of the quality of most of the courses that are offered. Courses on teaching content the widespread complaint is that many of them are very theoretical and not connected with problems real encountered in the classroom, and in many cases are taught by teachers who do not have direct contact with the work in schools. Furthermore, has been discussed the difficulty of attending training courses in due to the high number of teaching hours and the lack of time available for any more at their daily work.

3. The Impact of the Project on Teacher Training

The European project "Chemistry is all around network" has had a positive impact on the participants involved.



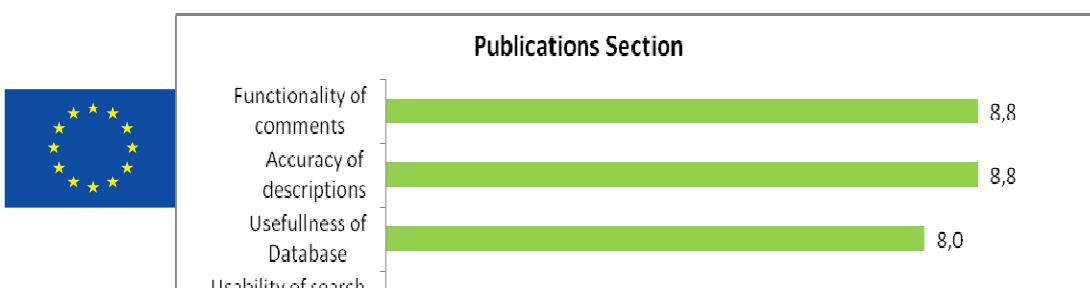
At the seminar on teacher training held in Granada in June 2013, which was attended by experts from the University of Granada and various schools of secondary and high school teachers was a meeting place where all participants presented the problems encountered in the training of teachers. The assessment of participants at the end of the seminar was very positive since it allowed the exchange of views on problems faced by teachers to keep up to date and properly motivate his students. The seminar came to the approaches of university professors and high school teachers and left open possible avenues of collaboration between them. He spoke of the creation of social networks of Exchange resources and information, scheduled visits of students of schools of secondary to the University facilities for laboratory practices, the possibility that researchers would be to secondary schools to explain their work to students. However all agreed to take forward these initiatives not enough with the goodwill of teachers and researchers, and that the Administration should make an effort to promote and finance such actions.



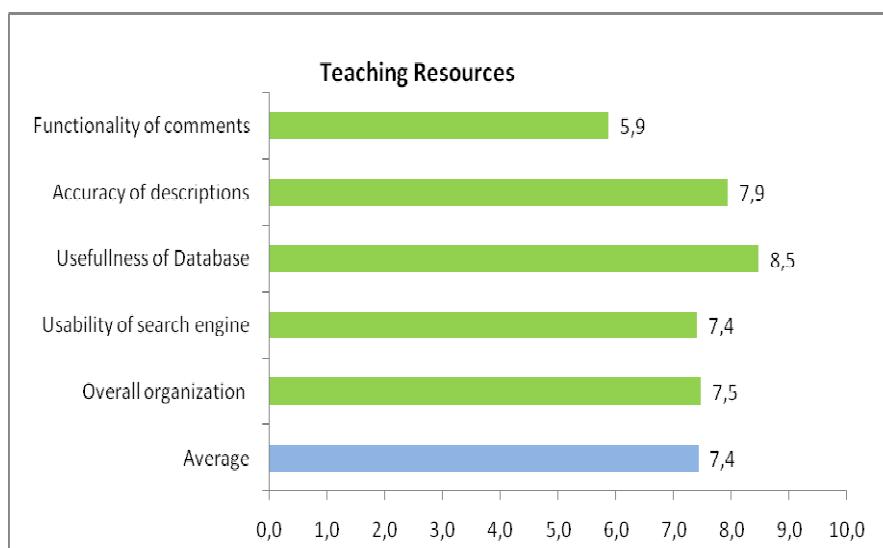
(Fig.2. Picture of the workshop on Teacher Training in Granada).

The material of the portal has been very useful for the majority of teachers participating in the project. According to the testimony of some participants, publications about the motivation of the students and teacher training have enriched their vision of education due to the different approaches provided by publications. Moreover, it has made clear that the problems facing teachers in different European countries have common roots.

On the other hand, the resources that have been available to teachers in the network have proved very useful in teaching practice. Many of them have been used in the classroom with very good reception by the students. Some of the participating teachers found the robot's search for the page a very useful tool, especially to classify the themes of different resources and pedagogical approaches. In the study for the evaluation of the various elements of the portal, both publications and resources are very positively valued highlighting the variety of resources available to teachers who visit the portal.



Ultimately, the majority of participants in the project consider the portal a valuable tool for use in the classroom, which is always updated and will allow the participation of teachers through comments, suggestions, and providing new resources, which could give rise to the expansion of the network of teachers who give use the resources of the portal or the creation of a parallel to the same social network to give continuity to the progress achieved with the project so far.



(Fig.4. Scores from the survey on the resources of the project portal)

4. Conclusions

The change of training system for teachers in Spain was very necessary but at the same time, it is not enough. Despite the enthusiasm of participating teachers and the possibilities offered by this new approach, there are still weak points pending improvement in relation to the Organization of teaching and evaluation control. In regards to continuing training, the offer it is broad but still have a way to go. Regarding to the project "Chemistry is all around network" is reacting to the expectations that both, organisers and participating teachers, had placed on. Both appreciate the publications and resources, furthermore, the seminars have shown many points in common between experts and teachers of secondary education and they have open possible future channels of collaboration provided that has as well the support of the administration.

What still remains to be defined is perhaps the future of the portal, which should not be a timely resource but a starting point to continue the work of collaboration between teachers and a place of reference for all new teaching resources that may arise in the future.

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